

We Claim:

1. A polymerization method comprising:
  - a. providing a substrate;
  - b. coating at least a portion of said substrate with a polymerizable composition;
  - c. providing an electron beam that is capable of producing pulses of accelerated electrons; and
  - d. irradiating said polymerizable composition with said pulses of accelerated electrons to polymerize said polymerizable composition.
- 5 10 2. The method of claim 1, wherein said polymerizable composition comprises at least one polymerizable monomer, at least one oligomer, or a blend thereof.
- 15 3. The method of claim 2, wherein said at least one polymerizable monomer comprises a C<sub>8-13</sub> alkyl acrylate monomer.
4. The method of claim 3, wherein said C<sub>8-13</sub> alkyl acrylate is selected from the group consisting of isoctyl acrylate, 2-ethylhexyl acrylate, lauryl acrylate and tridecyl acrylate.
- 20 5. The method of claim 2, wherein said at least one polymerizable monomer is selected from the group consisting of methyl methacrylate, isobornyl acrylate, tripropyleneglycol diacrylate, pentaerythritol triacrylate, pentaerythritol tetraacrylate, hydantoin hexacrylate, and trimethylolpropylmethacrylate.
6. The method of claim 2, wherein said polymerizable composition further comprises at least one comonomer.
- 25 7. The method of claim 6, wherein said at least one comonomer is selected from the group consisting of acrylic acid, isobornyl acrylate, octylacrylamide and n-vinyl pyrrolidone.
8. The method of claim 2, wherein said polymerizable composition further comprises a crosslinking agent.
- 30 9. The method of claim 2, wherein said polymerizable composition further comprises a thickener.
10. The method of claim 1, wherein said polymerizable composition is

irradiated with pulses of accelerated electrons during a residence time of about 1.5 seconds to about 5 seconds.

11. The method of claim 1, wherein said polymerizable composition is irradiated with said pulses of accelerated electrons having a dose per pulse of up to about 500 Gy.

5 12. The method of claim 1, wherein said polymerizable composition is irradiated with said pulses of accelerated electrons at a pulse rate of about 25 to about 3,000 pulses per second.

10 13. The method of claim 12, wherein said polymerizable composition is irradiated with said pulses of accelerated electrons and having a dose per pulse of about 10 to 30 Gy.

14. The method of claim 1, wherein the polymerizable composition is irradiated with said pulses of accelerated electrons at a temperature below 20°C.

15 15. The method of claim 1, wherein said polymerizable composition is irradiated with said pulses of accelerated electrons at a temperature below 20°C for about the first 40% to 70% of the time period that said polymerizable composition is irradiated.

16. The method of claim 1, wherein said polymerizable composition is polymerized heterogeneously in a single phase.

20 17. The method of claim 1, wherein said polymerizable composition is polymerized heterogeneously by irradiating said polymerizable composition with said pulses of accelerated electrons.

18. A polymerization method comprising:

25 a. providing a substrate;

b. coating at least a portion of said substrate with a polymerizable composition;

c. providing an electron beam that is capable of producing pulses of accelerated electrons;

30 d. irradiating said polymerizable composition with said pulses of accelerated electrons to partially polymerize said polymerizable composition;

5 e. providing an electron beam that is capable of producing a continuous beam of accelerated electrons; and

f. irradiating said partially polymerized polymerizable composition with said continuous beam of accelerated electrons to further polymerize said partially polymerized polymerizable composition.

10 19. A method for polymerizing a pressure-sensitive adhesive article comprising:

- a. providing a substrate;
- b. coating at least a portion of said substrate with a polymerizable composition;
- c. providing an electron beam that is capable of producing pulses of accelerated electrons; and
- d. irradiating said polymerizable composition with said pulses of accelerated electrons at a temperature below 20°C to polymerize said polymerizable composition of said pressure-sensitive adhesive article.

15 20. A pressure-sensitive adhesive article made by the method of claim 19, wherein said pressure-sensitive adhesive article has a conversion of greater than 90 wt%.

20 21. A pressure-sensitive adhesive article made by the method of claim 19, wherein said pressure-sensitive adhesive has a shear adhesion time of greater than 300 minutes.

22. A pressure-sensitive adhesive article made by the method of claim 19, wherein said pressure-sensitive adhesive has a peel adhesion to glass of greater than 25 N/dm.

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